150 Years of the New York Academy of Medicine: A Series of Exhibitions

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Abstract. *As the New York Academy of Medicine celebrates its 150th year as a leader in the field of urban health, it is instructive to review the events and decisions that influenced and shaped it. Since its inception, the Academy has taken an active role in lobbying state and local governments to enact more-effective public health laws and in educating the public about improving health conditions. During 1996 and 1997, the Academy Library's Historical Collections is mounting a series of six exhibitions that are intended to tell the story of public health in New York as influenced by the New York Academy of Medicine. The story will be told using printed books, pamphlets, posters, photographs, and manuscripts drawn from the Library's collections, as well as the Academy's archives. Each exhibition will highlight the Academy's accomplishments in the subject areas presented. In this article, we summarize all six of the exhibitions and offer an in-depth look at the first two exhibitions.*

150 Years of the New York Academy of Medicine

Nearly 150 years ago, a group of physicians responded to a meeting notice posted by Valentine Mott, Alexander H. Stevens, and Isaac Wood, in New York City. Their stated intention was "to elevate the character of [the] profession and to advance its interests and increase its usefulness by furnishing facilities for medical intercourse, promoting harmony among its members, and offering means of mutual improvement therein." This gathering, in December 1846, was well attended; interest was expressed by the participants in "changing the character of the [medical] profession. The name, "New York Academy of Medicine," was adopted at a

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subsequent meeting on January 6, 1847, and plans were made to locate a permanent facility in which to hold meetings.[1]

The Academy's commitment to "improve the health of the public" was evident not only in these initial meetings, but has remained strong throughout the past century and a half. For example, the Academy founded a medical library that would be open to the public; established programs to further medical education for physicians; and has created active committees, such as the Committee for Public Health in 1911, which carry out new research and work to create health policy for local, state, and federal governments. It is accomplishments such as these that the Historical Collections exhibition program intends to document, using a wide variety of media.

The Exhibition Series

The first exhibition in the series, "Public Health and the Changing Urban Landscape: 150 Years of the New York Academy of Medicine," highlighted significant public health issues over the last 150 years and how they changed New York City. A key item in the exhibit was Dr. John Griscom's survey of the conditions of the poor in New York City, which includes the author's recommendations for the enactment of housing reforms. Specific urban health issues included the city's water supply, health services, and sanitation. Statements concerning these urban health issues distributed by the Academy were used as frames of reference in the exhibit, which was on view from April 30 through July 26, 1996, and at the GreenPoint Bank, 110 E. 42nd Street, New York City, from October 15, 1996, to January 10, 1997.

The second exhibition, open from August 15 through November 15, 1996, was entitled, "A Perpetual Fever-Nest: Epidemics in Nineteenth Century New York." It documented the Academy's response to the many fatal illnesses that afflicted New Yorkers between 1846 and 1900. Included in the exhibition were cholera, yellow fever, typhus, typhoid fever, meningitis, diphtheria, and

smallpox. Precautions such as vaccination and improved hygiene were addressed, as were treatments. The Fellows of the Academy who were responsible for reform were highlighted. To illustrate and explain physicians' contributions in this area, relevant books, broadsides, pamphlets, newspaper clippings, manuscripts, and portraits were displayed. This exhibit will be on view at the GreenPoint Bank from January 17 to April 14, 1997.

The exhibition series continues with "Twentieth Century Epidemics in New York City," on view from December 1996 through March 1997. This exhibition chronicles epidemics plaguing New Yorkers during the present century. Included are polio, influenza, tuberculosis, AIDS, drug and alcohol addiction, and violence. The exhibition focuses on the leadership role that the Academy has played by issuing guidelines and lobbying the local, state, and federal governments, especially through the Committee on Public Health. Publications incorporating this information in their texts are used as frames of reference.

The fourth exhibition in this commemorative series, "Health Care Delivery in New York City" will be on view from March through May, 1997. To narrow the focus of this exhibition, specific groups and their health-care delivery will be highlighted in the show, including the elderly, women, and children. One important item planned for inclusion in the exhibition is the Academy's Committee on Public Health 1952 report, *Infant and Maternal Care in New York City*, which evaluated mothers' and infant care in 107 hospitals in New York City.

The fifth exhibition will focus on the Academy Library, which has been called "a valuable and timeless resource." Entitled "New York's Public Medical Library," the show will demonstrate how the Library has supported the programs of the Academy and how a core collection of general medical literature has been sustained along with more-comprehensive collections relating to the areas in which the Academy is actively involved. The Library's national role as a Regional Medical Library will be described, as will programs and the development of Historical Collections. Whereas one part of this exhibit will depict the Academy Library as New

York's source of health information, the Library will be placed in context in the second portion of the exhibit. The temporary and permanent homes of the Academy since its founding in 1847 will be illustrated through the use of architects' drawings, plans, and archival photographs.

The final exhibition planned for this anniversary series, "Urban Health Agenda for the Future," will take place during the fall of 1997. This exhibition will incorporate issues identified for the 150th Anniversary Symposium. The Agenda will focus on the critical health-care issues and challenges facing urban areas, and will outline an action-oriented strategy to guide leaders in health and medicine as they address the health needs of New York City through 2010.

An in-depth view of issues covered in the first two exhibitions in the series follows, based largely on the materials used therein.

Public Health and the Changing Urban Landscape

The first exhibition celebrating the New York Academy of Medicine's 150th anniversary, "Public Health and the Changing Urban Landscape," was on display from April 15 to July 26, 1996, in the Academy's lobby. The exhibition focused on how public health issues have shaped the physical city over the past 150 years, and how the Academy has been involved.

Over the past 150 years, the urban landscape of New York City has been influenced by changing attitudes about public health. Throughout this time, the New York Academy of Medicine has played a central role in the shaping of urban planning via public health policy. Among the public health issues that have affected the physical look of the city are sanitation, housing, air and noise pollution, hospitals, emergency services, immigration, and parks and recreational spaces.

For 19th-century health issues, the exhibition had a special focus on the public health advocacy of John Hoskins Griscom (1809–1874) and Stephen Smith (1823–1922), two founders of the

Academy who were influential in the city's public health policy. With their help, the city was transformed from a squalid "fevernest" to a relatively clean, modern city with a carefully planned and powerful health code.[2] In the twentieth century, the Academy's Committee on Public Health, created in 1911, provided an even more forceful and urgent voice on such issues as air, water, and noise pollution, hospital and ambulance reform, housing development and planning, and street cleaning.

Among artifacts exhibited were photographs and engravings showing the city before and after public health measures, such as sanitation, were brought into force. Included were maps of the city showing quarantine stations, "healthy" floor plans of housing and hospitals, images from investigations performed by the City Health Department and the New York Academy of Medicine concerning conditions of the poor, and original correspondence between members of the Academy and local government officials regarding public health concerns.

Sanitation

In the 19th century, most waste from homes and businesses, including food scraps, dead farm animals, and feces, was thrown into streets, alleyways, and vacant lots. Well before the advent of the germ theory of disease, public health advocates pushed for the removal of waste from streets, believing that its foul odors caused illness.[3] The landscape changed continuously throughout the 19th century in response to these concerns, with the building of sewers, the paving of streets, and the hauling of waste. The work was done at different periods by the city government and by private contractors, always with varying results.

The Academy entered the discussion in 1852, when John Hoskins Griscom began a survey of the city's squalor and recommended the creation of a "sanitary police."[4] In 1928, the Academy created the Committee of Twenty on Street and Outdoor Cleanliness, which lobbied for better street cleaning equipment and greater public awareness of sanitation issues.[5]

Housing: Internal Layout, Running Water, and Windows

The internal construction of housing was considered to be of great importance to health by many public health activists in the 19th century. Before the germ theory of disease was widely accepted, illness was thought to be caused by environmental factors such as dampness and the lack of proper ventilation and light. By the early 19th century, New York City was already replete with unhealthful housing; in 1842, Griscom estimated that 34,000 people in New York were living in 1,500 unventilated cellar dwellings and 1,700 alleyways and rearhouses. At the behest of public health advocates, numerous laws were passed over the following century regarding tenement housing, requiring apartment layouts that would allow for proper air circulation, natural light, and eventually toilets and running water.[6]

Housing: Urban Geography and Development

The location of housing was of as much concern to public health advocates as housing design. The proximity of housing to factories, slaughterhouses, marshlands, and parks, and the accompanying health benefits and risks, were all debated by residents, politicians, and the medical community. These concerns, unfortunately, were often exploited by those in the non-medical community who were more interested in their own agendas, such as removing "slums" or preventing the creation of new housing developments.[7] All of these issues have been exacerbated by the fact that New York City, especially the Borough of Manhattan, has nearly always experienced housing shortages, driving land prices up and creating pressure to use all possible land for housing and business development.[8]

Air and Noise Pollution

Air and noise are as much a part of the urban landscape as buildings and infrastructure; both concern public health advocates. In the 19th century, before the acceptance of germ theory, dust, smoke, and foul odors from slaughterhouses, dying horses, tanneries, and bone boiling establishments were thought to contribute to

the spread of disease. Later, the effects of chemicals in the air, such as carbon monoxide, began to concern public health officials.[9] The *Bulletin of the New York Academy of Medicine* has been publishing on the dangers of air pollution since the mid-19th century.[10]

Complaints about noise in urban settings have been prevalent since the late 19th century. In 1929, New York City became one of the first cities to attempt to address complaints about noise by appointing the Noise Abatement Commission. Recommendations were made to industry officials and transit authorities to reduce noise in the city, but it is thought that noise pollution has become worse since that time.[11] It is known that city noise can damage hearing, interfere with sleep, and cause stress to urban dwellers. Scientists are currently looking into how stress from noise might lead to cardiac, nervous, and fetal development disorders.[12]

Ambulance Service

A reliable ambulance service is an important part of public health in any city, and the ambulance has been an important part of New York City's landscape for longer than any other city in the world. In 1870, New York City became the first city in the world to have a public ambulance service, when Bellevue Hospital organized a fleet of horse-drawn ambulances. In the first year of service, these ambulances responded to more than 1,800 calls.[13] By the 1910s, horse-drawn ambulances and motorized ambulances were working side by side. In the 1930s Bellevue Hospital even implemented the use of a "scooter ambulance," a motorcycle with a side carriage for the patient.[14] Automobiles eventually became the standard form of ambulance service, with helicopters used at times to move patients in extreme emergencies.

The New York Academy of Medicine has an archival collection of original photographs of ambulances used by Bellevue Hospital from 1867 to 1945. The Academy's Committee on Public Health has also issued several reports on ambulance service in New York City.

Immigration

Immigration, public health, and the urban landscape have intersected at a number of points during the history of New York City. In the 19th century, immigrants were perceived as bringing epidemic diseases to New York City; quarantining newcomers was seen as a necessity. The practice of quarantining involved the building of quarantine stations on islands in New York Harbor. For most of the 19th century such stations were located first on Governor's Island, then on Staten Island, and finally on Ellis Island.[15]

Another public health issue that concerns immigrants is the sweatshop, which was merely called "sweating" when the problem was first identified in the late 19th century. In sweatshops immigrants work long hours in close quarters, which has added to the spread of tuberculosis, among other serious health problems.[16]

Hospitals

How hospitals were built and where they were located in the city have always been public health issues. In the 19th century, before germ theory was accepted, proper ventilation for hospital wards was considered crucial for the health of patients, which was one reason for the large, open wards with rows of beds, characteristic of 19th-century hospitals.[17]

In the 19th century, hospitals were often located with quarantining in mind and were, therefore, built on islands, such as Blackwell's (now Roosevelt) Island, which originally housed Bellevue and several other hospitals.[15] When located in the city, they were often placed in less populated areas and close to the water. By the middle of this century, however, it was thought that hospitals and smaller health care centers should be dispersed more evenly throughout the city so that all residents could have easy access to a physician and health education.[18]

Parks and Recreational Spaces

Wide open spaces, where city residents could exercise and breathe fresh air, have long been important to public health advocates. In the second half of the 19th century, a movement took place to ensure that New York would have adequate parks and recreational spaces.[19] Today, 13.5% of the land within the city limits has been set aside for parks, the highest ratio of any city in the nation. In the early 20th century, charitable organizations concentrated on maintaining parks created in the previous century and on creating new neighborhood playgrounds, especially for indigent children.[15]

The Water Supply: Wells, Reservoirs, and Public Baths

Public wells, reservoirs, and bath houses became important parts of the urban landscape at different periods in the city's history, and public health played a vital role at every stage. Early in the city's history, residents obtained water from ponds, streams, and local wells, but these supplies soon became insufficient. A cholera epidemic in 1832 led some to suspect that lower water quality, a result of poor sanitation, was partially to blame. In 1842 an aqueduct was built from the Croton River in Westchester County to reservoirs in what is now Central Park and at 42nd Street and Fifth Avenue.[15]

While the role of germs in causing illness was not fully understood until the end of the 19th century, public health advocates often kept close watch over the water supply, feeling that its high quality was necessary for cleanliness as well as for safe drinking. When germ theory was accepted by physicians in the late 19th century, personal hygiene became a crucial part of public health activism and the city began building a system of public baths where the poor could take regular showers and exercise in swimming pools.[11(pp. 517–519)]

A Perpetual Fever-Nest: Epidemics in Nineteenth Century New York

The next exhibition at the New York Academy of Medicine Library, "A Perpetual Fever-Nest: Epidemics in Nineteenth Cen-

tury New York," was open from August 15 to November 15, 1996. It focused on a variety of lethal diseases that afflicted residents of the city during that era of scientific and social change. In 1863, New York had a higher death rate than any other large city in the western world, including London, Liverpool, Boston, and Philadelphia, in large part because of epidemic diseases.[20] The 19th century, however, was a period of remarkable advances in science, medicine, and public health, and by the end of the century, the causes, if not always the cures, of many epidemic diseases were understood and were acted on, often with significant success. The exhibition examined these diseases, their effect on the city, and the New York Academy of Medicine's involvement in combatting them.

Many epidemic diseases, such as cholera and yellow fever, came through the city with a sudden force, afflicting large percentages of its residents, often killing many of those who became ill; such diseases often then disappeared for months or years at a time, only to return with the same swiftness and destruction. Still other diseases were endemic, having a constant presence in the city, including tuberculosis, pneumonia, and diarrheal diseases, all three of which together may have claimed as many New Yorkers' lives as all other 19th-century epidemic diseases combined.[21] Among the other diseases discussed in the exhibition are smallpox, diphtheria, typhus, typhoid, epidemic meningitis, scarlet fever, and measles.

The title of the exhibition is a phrase used in reference to the squalid neighborhoods of New York in an 1865 report on the sanitary conditions of the city, published by the Citizens' Association of New York.[22] In the previous 10 years, the city had survived the ravages of smallpox, typhus, typhoid, and cholera epidemics. Willard Parker, a founder of the New York Academy of Medicine, and a group of other physicians founded the Citizens' Association in 1864 and published its report on the city's sanitary conditions to lobby the State of New York to reform its public health laws. In 1866, the State Assembly enacted the Metropolitan Health Bill, which established a rel-

atively independent Metropolitan Board of Health for New York City and Brooklyn. In part because the Metropolitan Board of Health was given extensive powers and was less political, and more medical, in its makeup, New York quickly became a model of urban public health, as its declining mortality rates of the 1870s, 1880s, and 1890s show.[11(p.xxi)]

Newspapers of 19th-century New York were rife with stark imagery of death and destruction caused by epidemic diseases. *Frank Leslie's Illustrated Newspaper* and *Harper's Weekly* carried vivid illustrations, many of them in color, with skeletons representing epidemic diseases looming over the city as giant specters, hiding in dark alleys and doorways, and arriving in town as exotic, foreign visitors. Other illustrations depicted the sick, quarantine stations, and vaccination programs. A selection of these images, housed in the Healy Collection of medical illustrations from 19th-century New York newspapers, was included in the exhibition (Figs. 1 to 4).

Throughout the second half of the 19th century, the New York Academy of Medicine and its members lobbied for public health reform and shared their findings with each other in their fight against epidemic diseases. In 1847, the Academy appointed a committee to investigate and report on a typhus fever outbreak in the city[1(p.17)]; decades later, Edward Livingston Trudeau, a fellow of the Academy, founded the sanatorium movement in the 1890s to address a cure for tuberculosis.[1(p.218)] Sanitation and quarantining measures were debated and lobbied by members of the Academy, and the Academy held conferences and published findings of its members in support of scientific research into the roots of these diseases.

Etiology and Action

From ancient times to well into the 19th century, the cause of epidemics was a subject of great speculation. The most common theory was that "miasma," or polluted air, caused the body to become out of balance, either too hot, too cold, too damp, or too dry. Whether these diseases were passed from individual to indi-

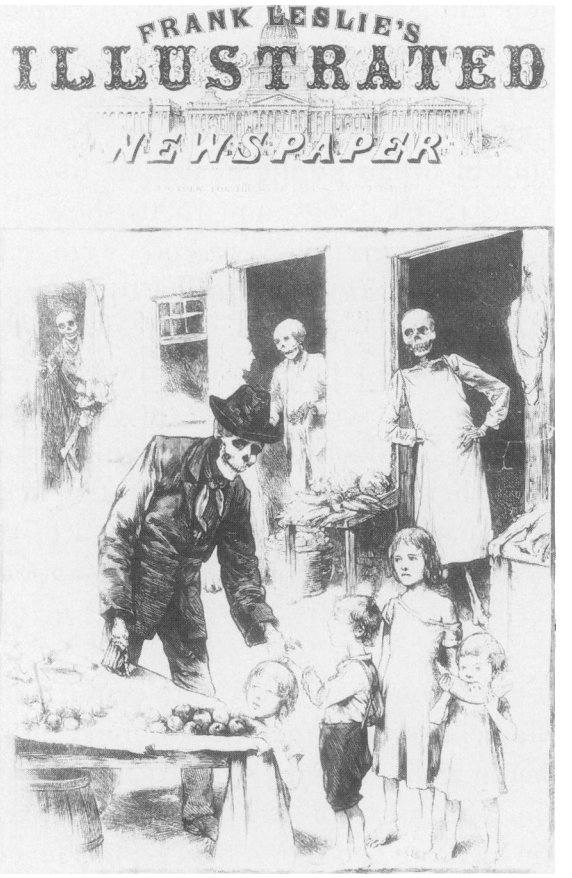


FIG. 1. "A Hint to Boards of Health—How Our Cities Invite the Cholera." *Frank Leslie's Illustrated Newspaper*, August 2, 1884.

vidual was hotly debated; quarantines were often set up, but not everyone agreed that they made a difference. Other theories ranged from the eruption of volcanoes to the use of electricity.

In the 1880s, however, ideas about epidemic diseases began to change. In 1882, Robert Koch, a German bacteriologist, isolated the tubercle bacillus, and in 1883 he isolated the microbe that causes cholera. T. Mitchell Prudden and Hermann M. Biggs, both young New York physicians, went to Germany to learn Koch's methods. The two returned to New York and decided to apply Koch's findings to public health by lobbying for and then directing the Laboratory of Bacteriology of the New York City Department

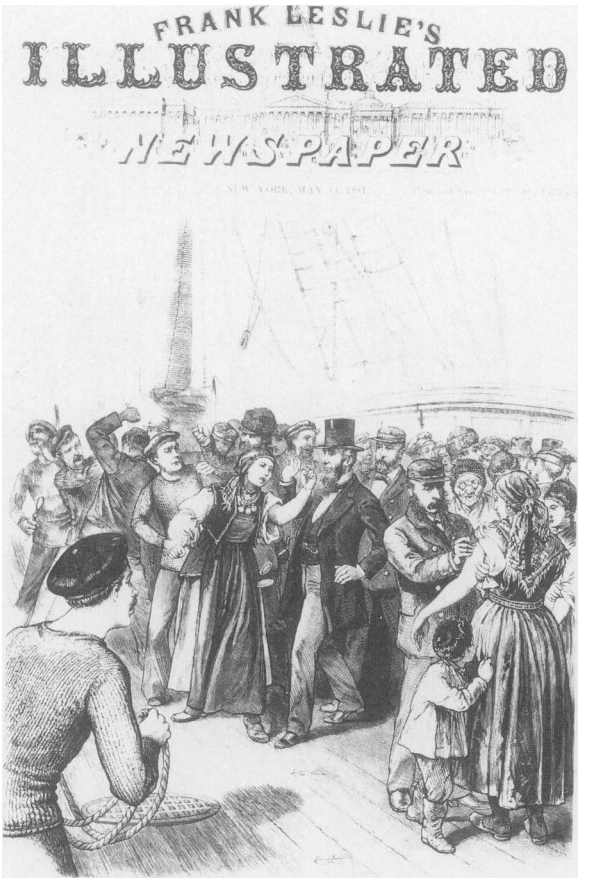


FIG. 2. "New York City—Health Officers Vaccinating Russian and Polish Emigrants on Board the Steamship 'Victoria' at Quarantine, April 25." *Frank Leslie's Illustrated Newspaper*, May 14, 1881.

of Health. Prudden and Biggs used the laboratory to diagnose new cases of epidemic diseases and to find antitoxins or other treatments for them. They changed the face of public health over the entire country.[23]

Yellow Fever

Yellow fever is an acute viral disease of short duration that is transmitted to humans by the *Aedes aegypti* mosquito. In classic cases, it is characterized by fever, headache, jaundice, albuminuria (high protein content in the urine), and hemorrhage into the stomach and the intestinal tract, sometimes causing the vomiting

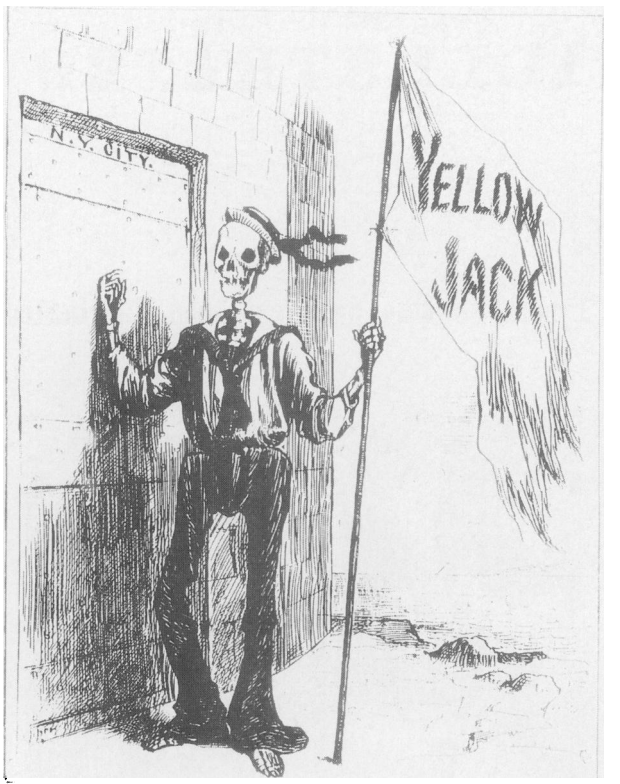
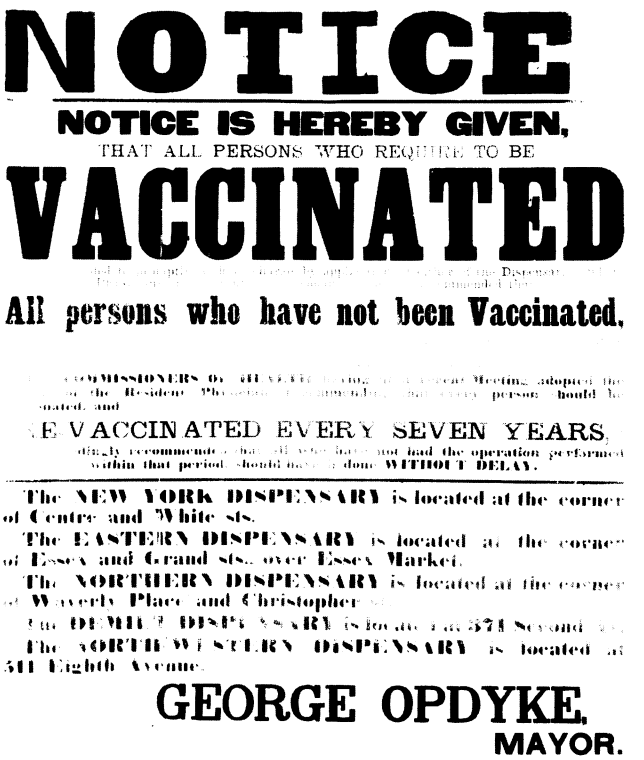


FIG. 3. "Yellow Jack. Shall We Let Him In? Mr. Mayor and gentlemen of the Board of Alderman, the answer rests with you." *Frank Leslie's Illustrated Newspaper*, September 21, 1878.
Although there had not been an outbreak of yellow fever in New York in over 50 years, severe epidemics were raging in Savannah, New Orleans, and Memphis in the 1870s, and many New Yorkers feared its return.

of black blood. During epidemics, mortality rates were recorded as high, between 20% and 70%, but research today shows that the mortality rate is actually very low, with most cases being very mild or even unnoticed. The *A. aegypti* mosquito must live in close proximity to host humans, making urban settings with dense populations a perfect habitat. Because water is necessary for its reproduction, epidemics often followed periods of heavy rainfall. Yellow fever may have originated in the Caribbean or Africa; many individuals of West African descent seem to have a natural immunity to the disease.[24]

The first recorded epidemic of yellow fever in New York City



NOTICE

NOTICE IS HEREBY GIVEN,

THAT ALL PERSONS WHO REQUIRE TO BE

VACCINATED

All persons who have not been Vaccinated,

E VACCINATED EVERY SEVEN YEARS,

The NEW YORK DISPENSARY is located at the corner of Centre and White sts.

The EASTERN DISPENSARY is located at the corner of Essex and Grand sts., over Essex Market.

The NORTHERN DISPENSARY is located at the corner of Waverly Place and Christopher

The DEMILT DISPENSARY is located at 371 Second

The NORTH WESTERN DISPENSARY is located at 511 Eighth Avenue.

GEORGE OPDYKE,
MAYOR.

FIG. 4. New York City, Office of the Mayor. *Notice* New York: New York City, Office of the Mayor, ca. 1862.

was in 1702, followed by more severe outbreaks in 1731, 1742, and 1743. Between 1791 and 1821, yellow fever epidemics plagued the city almost annually; the most severe occurred in 1798, when 714 people perished. Because it was believed that yellow fever was caused by foul, polluted, or marshy air, then referred to as "miasma," as well as by filthy streets, massive cleanup efforts were often prompted by these epidemics. After a small outbreak in 1822, in which 166 people died, yellow fever mysteriously disappeared from much of the Northeastern American coast.[15]

Smallpox

Smallpox was a viral infection passed by airborne transmission. The onset of the disease was abrupt, characterized by high fever, headache, and severe back and muscle pain. After 2 to 5 days, its

well-known rash appeared on the face, palms, soles, and sometimes the torso, often leaving permanent scars. During the most severe epidemics, about 25% to 30% of people affected by the disease died.[24]

Smallpox was the most frequently occurring epidemic during the 19th century, with 14 separate outbreaks between 1804 and 1902. The disease often accounted for more than 1,000 deaths per year, particularly during the 1870s.[11(p.147)] As early as the 18th century, Europeans began "inoculating" themselves against the disease by intentionally infecting themselves with the smallpox virus, often only getting a mild case and then building immunity. Sometimes, however, inoculation caused severe cases of smallpox and even death. In 1798, Edward Jenner discovered that exposure to the benign cowpox granted immunity to smallpox, thus inventing "vaccination" (derived from the Latin word for "cow").[24] However, many physicians and lay persons were skeptical of the procedure because of their experiences with inoculation and their view of the cow (cowpox's host) as unclean. It wasn't until the 1940s that the disease was finally wiped out in New York through massive vaccination efforts.[25]

Cholera

Cholera is an acute infectious disease caused by the bacterium *Vibrio cholerae*, which is typically transmitted through food and water contaminated by infected feces. Symptoms include continuous diarrhea, vomiting, dehydration, and severe muscle cramps followed by kidney failure and collapse. Today it is curable with prompt treatment, including intravenous infusions and antibiotics; however, cholera cases in the 19th century usually resulted in death. Untreated, cholera's death rate ranges from 50% to 70%. Cholera was often pandemic, suddenly sweeping across the globe in a matter of months and taking tens of thousands of lives; news of outbreaks on the other side of the world caused terror in port cities like New York.[24] Epidemic years in New York City were 1832, 1834, 1849, 1854, and 1866.

Hermann Biggs and T. Mitchell Prudden served as consulting pathologists to the Health Department, as well as on an advisory committee to the New York Academy of Medicine, to study the establishment of a quarantine station on Hoffman Island. Prudden and Biggs are credited with having prevented cholera epidemics throughout the last quarter of the 19th century by using new laboratory techniques to diagnose cases of cholera.[23]

Tuberculosis

Tuberculosis, formerly known as "phthisis," and later, "consumption," is caused by the *Mycobacterium tuberculosis* and is commonly transmitted through the air via droplet infection. Tuberculosis most frequently affects the lungs, but it often causes painful disease in the meninges, intestines, bones, and lymph glands. The most well-known symptom is a violent cough, which produces a sputum streaked with blood, but other symptoms include fatigue, anorexia, anxiety, chills, and persistent fever. The disease has a variable and indefinite incubation period, often waiting in the body until its host's immune system is weakened. After onset, the disease may take months, years, or even decades for the sufferer to experience either recovery or death.[24]

Endemic in New York City, rather than epidemic, the effects of this disease were felt throughout the 19th century. By the 1890s, it accounted for more than 5,000 deaths per year.[11(p.159)] Throughout the 19th century and into the 20th, the Academy continued to address methods of attacking this contagious disease: Edward Livingston Trudeau, a tuberculosis sufferer himself, founded the sanatorium movement[26]; Hermann Biggs began efforts within the Department of Health to identify New Yorkers with tuberculosis[23(pp.175-181)]; and in December of 1900, a highly active Committee on Tuberculosis was authorized by the Academy, consisting of Drs. Abraham Jacobi, George L. Peabody, E.G. Janeway, Alfred Meyer, and A. H. Smith.[1(p.282)]

Diphtheria

Diphtheria, an old disease once known as "throat distemper," was endemic in New York City. In the middle of the 19th century its incidence began to rise, peaking in 1894 with almost 2,500 deaths.[11(p.155)] Diphtheria is mainly a childhood disease, caused by a bacterium, *Corynebacterium diphtheriae*, also known as the Klebs-Löffler bacillus. In its worst cases, the bacterium itself becomes infected with a phage virus, which, in turn, causes the release of a highly virulent toxin into the patient's bloodstream, killing from 30% to 50% of young children stricken ill with the virally infected bacillus. The toxin causes membranes in the throat and mouth of the young patient to swell up, making breathing difficult, and sometimes impossible.[24]

In 1892 New York City was on the cutting edge of public health, creating the Division of Pathology, Bacteriology, and Disinfection within the Department of Health, the first instance in the country of a city using the laboratory to combat infectious disease. Hermann M. Biggs, the Division's first director and a Fellow of the New York Academy of Medicine, began testing children for diphtheria in the laboratory and began a campaign to make available a new antitoxin for ill children and immunization for the healthy.[23(pp.165-172)] Incidence of the disease began declining immediately, although the disease posed a significant threat to children in New York City until the 1930s.

Pneumonia

Pneumonia is an acute inflammatory condition of lung parenchyma (lung tissue excluding the airways) caused by a variety of infectious agents (fungal, bacterial, viral, etc.) and toxins. The classic form is lobar pneumonia, which is usually localized to part or all of one of the five lobes of the lungs and is caused by a *pneumococcus*. Lobar pneumonia left untreated by antibiotics has a mortality rate of about 30%. Lobar pneumonia is an infectious, but not particularly contagious, condition; patients usually are suscep-

tible to it after having been weakened physically, often by another ailment. Hence, pneumonia was often the true cause of death of many suffering from other diseases, such as tuberculosis.[24]

During the last 40 years of the 19th century, tuberculosis, pneumonia, and other respiratory diseases were clearly the chief causes of death in New York City. In 1870, 1,836 deaths were attributed to pneumonia; the figure peaked in 1893 at 6,487 deaths. Pneumonia was not recognized as an infectious disease for many years; rather, it was viewed as a constitutional disorder. In 1875 the City Health Department issued a report on pneumonia merely tallying the number of deaths associated with the disease. It was not until the 20th century that treatments were pursued more vigorously.[11(p.159)]

Measles

Measles is a common, acute, viral infectious disease, affecting mainly children and characterized by fever and a typical red, blotchy rash combined with cough, coryza, or conjunctivitis. Measles is one of the most highly communicable diseases, easily spread through direct contact between persons and through soiled objects and airborne particles. Measles tends to move through populations every 2 to 5 years, usually striking all children who had not been born at the time of the prior epidemic. The mortality rate can be as high as 5% to 10% of all cases.[24]

Measles had always been a common disease among Europeans, so it was always present in New York City. By the 1880s, however, many childhood diseases were causing more and more casualties, and measles often claimed as many 700 deaths per year in this decade.[11(p. 158)]

Scarlet Fever

Scarlet fever, also known as "scarlatina" in its less virulent form, is an acute infectious disease caused by a hemolytic *streptococcus*, which is closely related to the bacterium that causes strep throat. It is characterized by the sudden appearance of a sore throat, with fever and headache and a rash that appears about 2 days after onset

of the fever. Scarlet fever is commonly a childhood illness and is only slightly less lethal than diphtheria.[24]

Scarlet fever epidemics struck New York City often in the 18th century, but in the 1830s a stronger, more virulent form of the disease appeared. During most years in the second half of the 19th century, scarlet fever was responsible for nearly 1,000 deaths annually; in 1881 and 1882 the numbers of deaths were 1,964 and 2,066, respectively. Despite its lethal character, scarlet fever did not receive the same attention by the Board of Health as diphtheria until the 20th century.[11(p.158)]

Typhus

Epidemic typhus fever is an acute rickettsial disease, caused by *Rickettsia prowazekii*, and is transmitted by the body louse, *Pediculus humanus corporis*. Symptoms include high fevers (between 102°F and 105°F), prostration, nausea, headache and body aches, and a dark red rash. Because it is spread by the louse, typhus is often associated with extremely poor living conditions, with a prevalence of the disease in detention facilities, filthy ship accommodations, and camps; one of its most common names in the past was "jail distemper." Mortality rates in untreated typhus fever vary between 5% and 25%, occasionally reaching 40%; as the age of the patient increases, so does mortality. Typhus and typhoid were not distinguished from each other, or from other similar fevers, until late in the 19th century. The spread of the disease by louse was not understood until the early 20th century.[24]

Typhus was usually brought into the city by immigrants who had been in transit for weeks in unsanitary conditions and who often came from areas where typhus was endemic. Flare-ups of typhus occurred in 1868, 1881, and 1893, when 137, 160, and 200 people were killed, respectively.[11(p.164)]

Typhoid Fever

Typhoid fever is a systemic infection caused by the bacterium *Salmonella typhi* and is characterized by a variety of symp-

toms, including sustained fever, headache, cough, intestinal bleeding, abdominal pain, profound weakness, and a rash. Just as with cholera, typhoid fever is nearly always spread by consumption of food or water that has been infected with *S. typhi.* Untreated, the illness claims the lives of about 10% to 20% of its sufferers and leaves about 2% as permanent carriers of the organism.[24]

Typhoid was a serious problem in New York City during all of the 19th century. From 1867 to 1897, annual death tolls from typhoid ranged from 261 to 625.[11(p.162)]

Cerebrospinal Meningitis

Meningitis is an acute inflammation of the meninges, the membranes covering the brain and spinal cord. Like pneumonia, it can be the result of a number of primary infections. Cerebrospinal meningitis (CSM), or meningococcal meningitis, is the only form of the condition that appears as epidemic. CSM is caused by the *Neisseria meningitidis* bacterium and was once known as "spotted fever" and "sinking typhus." It is characterized primarily by collapse, high fever, and skin blotches, and is highly fatal if untreated, with mortality rates ranging from 50% to 90%.[24]

CSM made its first noticeable appearance in New York City in 1872, when an epidemic caused 782 deaths. For the rest of the century, about 150 deaths a year were attributed to the disease, except in 1881 and 1893, when epidemics claimed 461 and 463 lives, respectively. Death tolls rose in the early 20th century to as many as 1,000 per year. Because CSM was thought to be caused by environmental factors and not infection, for many years, sanitary precautions on the part of the Board of Health were thought to be adequate to stem further outbreaks. [11(pp.164-165)]

Conclusion

The exhibitions illustrate the Academy's contributions to New York City, including its efforts to further medical educa-

tion; establish an effective board of health; provide public access to the Academy Library; hold public lectures; and put forth recommendations to the public and to governing bodies for the betterment of health care and conditions in New York City.

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